

Luther King Jr. Avenue SE., Washington, DC 20593-7509.

(b) Each application for approval must contain—(1) The name and address of the applicant;

(2) Two copies of plans or specifications of the material;

(3) A detailed description of the quality control procedures used in manufacturing the material; and

(4) A test report containing observations and results of approval testing conducted.

(c) The Commandant advises the applicant whether the retroreflective material is approved. If the material is approved, an approval certificate is sent to the applicant.

[CGD 76-028, 44 FR 38786, July 2, 1979, as amended by CGD 82-063b, 48 FR 4783, Feb. 3, 1983; CGD 88-070, 53 FR 34537, Sept. 7, 1988; CGD 95-072, 60 FR 50467, Sept. 29, 1995; CGD 96-041, 61 FR 50734, Sept. 27, 1996; USCG-2009-0702, 74 FR 49238, Sept. 25, 2009; USCG-2013-0671, 78 FR 60162, Sept. 30, 2013]

§ 164.018-9 Design requirements.

(a) Type I retroreflective material must be capable of being attached to lifesaving equipment either by sewing it to the equipment or by means of an adhesive. Type II material must be capable of being attached to lifesaving equipment either by mechanical fasteners or by an adhesive.

(b) The following information must be stated on retroreflective material or on the package in which it is supplied to a user:

(1) Each surface to which the retroreflective material is designed to be attached.

(2) The instructions for attaching the material to each surface described in paragraph (b)(1) of this section.

(c) When retroreflective material designed for use with an adhesive is tested in accordance with the “adhesion” test method listed in §164.018-11, the material must not peel for a distance of more than 5 cm (2 in.).

(d) When dry material is tested in accordance with the “reflective intensity” test method listed in §164.018-11, the reflective intensity of the material must be equal to or greater than the values for reflective intensity listed in Table 164.018-9.

(e) When wet material is tested in accordance with the “reflective intensity during rainfall” test method listed in §164.018-11, the reflective intensity of the material must be at least 90 percent of the values listed in Table 164.018-9.

(f) The reflective intensity of material after testing in accordance with the “resistance to accelerated weathering” test method listed in §164.018-11 must be at least 50 percent of the values listed in Table 164.018-9.

(g) After testing in accordance with the “fungus resistance” test method listed in §164.018-11, retroreflective material must not support fungus growth, and the reflective intensity of the material must be equal to or greater than the values for reflective intensity listed in Table 164.018-9.

(h) The reflective intensity of materials after testing in accordance with the “resistance to water immersion” test method described in §164.018-11, must be equal to or greater than the values listed in Table 164.018-9, except that retroreflectivity is not required in the area extending outward 5 mm (0.2 inches) from each side of the cuts made in the material.

(i) The reflective intensity of material after testing in accordance with the “abrasion resistance” test method described in §164.018-11(b)(2), must be at least 50 percent of the values listed in Table 164.018-9

(j) After retroreflective material is tested in accordance with the “soil resistance and cleanability” test method described in §164.018-11(b)(3) the material must not have any visible damage or permanent soiling.

(k) Except as provided in paragraphs (c) through (j) of this section, retroreflective material when tested in accordance with the test methods listed in §164.018-11 must meet the requirements prescribed for those test methods in Federal Specification L-S-300.

TABLE 164.018-9—REFLECTIVE INTENSITY

Divergence angle ¹ (Observation angle) ²	Incidence angle ¹ (Entrance angle) ²	Reflective intensity ¹ (Specific intensity per unit area) ²
0.2°	- 4°	150
.2°	+30°	75
.2°	+45°	50
.5	- 4°	57
.5	+30°	33

TABLE 164.018-9—REFLECTIVE INTENSITY—
Continued

Divergence angle ¹ (Observation angle) ²	Incidence angle ¹ (Entrance angle) ²	Reflective intensity ¹ (Specific intensity per unit area) ²
.5	+45°	25
2.0°	-4°	2.5
2.0°	+30°	2.0
2.0°	+45°	1.0

¹These terms are described in Federal Specification L-S-300.

²These terms are described in Federal Test Method Standard 370.

§ 164.018-11 Approval tests.

(a) Retroreflective material submitted for Coast Guard approval must be tested in accordance with the following test methods described in Federal Specification L-S-300:

- (1) Test conditions.
- (2) Test panels.

(3) Adhesion test method using a 0.79 kg (1.75 lb.) test weight, except that one test panel must be immersed in distilled water in a covered container for 16 hours before the weight is applied and the other test panel must be immersed in salt water (4% NaCl by weight) in a covered container for 16 hours before the weight is applied. (This test method is required only for retroreflective material that is designed for use with an adhesive. If a particular test panel used in testing results in a test failure, the retroreflective material will not be approved for attachment to material of the type used as the test panel. The retroreflective material may nevertheless be approved for use with other types of material depending on the results of testing with the other panels. See paragraph (d) of this section for a listing of tests panels used.)

(4) Flexibility at standard conditions test method, except that when testing Type I material—

- (i) The material must be unmounted;
- (ii) A 1.5 mm (1/16-inch) mandrel must be used in place of the mandrel described in the test method; and
- (iii) After testing at standard conditions, the material must be placed in a chamber at a temperature of -18 °C. (0 °F.) for at least 1 hour and then retested in the chamber at that temperature.

(5) Reflective intensity.

(6) Resistance to accelerated weathering test method and substest methods “reflective intensity after accelerated weathering,” “reflective intensity during rainfall,” and “adhesion after accelerated weathering.” (The “adhesion after accelerated weathering” test method is required only for materials designed for use with an adhesive. The “resistance to accelerated weathering” test method must be performed for 250 hours, if testing Type I material, and for 1,000 hours if testing Type II material.)

(7) Resistance to heat, cold, and humidity.

(8) Fungus resistance.

(b) Retroreflective material submitted for approval must also be tested as follows:

(1) *Resistance to water immersion.* Two test panels are used. The test panels and test conditions must meet paragraphs (a)(1) and (a)(2) of this section. The retroreflective material on each test panel is cut with a sharp knife from each corner to the corner diagonally opposite so that an “X” is formed. The cuts must be made completely through the material to the metal panel. One panel is immersed in distilled water in a covered container. The other panel is immersed in salt water (4% NaCl by weight) in a covered container. After 16 hours in water, the panels are removed from the containers, rinsed of deposits, and dried. Reflective intensity values at the angles listed in Table 164.018-9 must be measured within 2 hours after removal of the panels from the water. When measuring the reflective intensity values, the area within 5 mm (0.2 in.) of either side of the “X” cuts, and within 5 mm of the cut edges of the material, must not be counted.

(2) *Abrasion resistance.* One test panel is used. The panel and test conditions must meet paragraphs (a)(1) and (a)(2) of this section. The test apparatus must meet Federal Test Method Standard 141, Method 6142, except that the brush must be dry. One thousand brush strokes are applied to the material. The test panel is then wiped with a